



# Chicago COVID-19 Community Vulnerability Index

## Chicago CCVI

January 25, 2021



# Chicago COVID19 Community Vulnerability Index

- Adapted and modified from Surgo Ventures collaboration <https://precisionforcovid.org/ccvi> and the CDC Social Vulnerability Index
- Chicago CCVI identifies communities that have been disproportionately impacted by COVID-19 and are uniquely vulnerable to barriers to COVID-19 vaccine uptake
- Vulnerability is defined as a combination of:
  - Sociodemographic factors
  - Epidemiological factors
  - Occupational factors
  - Cumulative COVID burden
- Ten (10) components included in the index are COVID-specific risk factors and outcomes combined with factors known to be associated with social vulnerability in the context of emergency preparedness
- Chicago CCVI is derived from ranking values of the 10 components by geography, then synthesizing them into a single composite weighted score. The higher the score, the more vulnerable the geographic area
- In Chicago, we are currently measuring CCVI at the community area level

# Chicago CCVI Sociodemographic Risk Factors



At the community area level:	
% Individual Poverty	2018 US Census American Community Survey
% 16+ unemployment	2018 US Census American Community Survey
% Per capita income	2018 US Census American Community Survey
% 25+ no HS diploma	2018 US Census American Community Survey
% Uninsured	2018 US Census American Community Survey
% Population 17 and under	2018 US Census American Community Survey
% living w disability	2018 US Census American Community Survey
% Crowded housing	2018 US Census American Community Survey
% Single-parent households	2018 US Census American Community Survey
% w/ no primary care provider	2019 CDPH Healthy Chicago Survey

Surgo combined 9 equally weighted values into 2 components:

- **Socioeconomic (percentile)**
- **Household (percentile)**

Data analyzed and compiled by CDPH into one component

- These 3 components were averaged into the overall risk factor score

# Chicago CCVI Epidemiological Risk Factors



At the community area level:	
% 65+ years	2019 US Census American Community Survey
% adult obesity	2019 CDPH Healthy Chicago Survey
% adult current smoking	2019 CDPH Healthy Chicago Survey
% adult diabetes	2019 CDPH Healthy Chicago Survey

Data analyzed and compiled by CDPH into one component

3 indicators were equally weighted and combined into 1 component:  
**% of population w/ one or more of these comorbid conditions**

- These 2 components were averaged into the overall risk factor score

# Chicago CCVI Occupational Risk Factors



At the community area level:	Data Source
Education (teachers, support staff)	2019 US Census American Community Survey
Manufacturing/Food production	2019 US Census American Community Survey
Material moving (grocery store, laborers, freight)	2019 US Census American Community Survey
Personal Service (Childcare, recreation and entertainment workers)	2019 US Census American Community Survey
Public Safety (first Responders/corrections)	2019 US Census American Community Survey
Transportation (public transit, airport truck, taxi)	2019 US Census American Community Survey
Food Service (cooks, servers, food prep, kitchen)	2019 US Census American Community Survey
Ratio of mobility in 2020 compared to 2019	BlueDot (2019 and 2020)

Data analyzed and compiled by CDPH based on ACIP guidance and US Bureau of Labor Statistics Occupation Classifications

Total # of each occupation group in each community area were equally weighted and combined into 1 component  
**[% of population that are essential workers]**

← Data compiled by CDPH into one component

- These 2 components were averaged into the overall risk factor score

# Chicago CCVI Cumulative COVID Burden



At the community area level:	
Diagnosed COVID-19 cases (rate per 100k)	CDPH Communicable Disease Surveillance, I-NEDSS, Jan 1 – Dec 31, 2020
COVID-19 hospital admissions (rate per 100k)	CDPH Communicable Disease Surveillance, I-NEDSS, Jan 1 – Dec 31, 2020
COVID-19 mortality rate (rate per 100k)	CDPH Communicable Disease Surveillance, I-NEDSS, Jan 1 – Dec 31, 2020

Data analyzed and compiled by CDPH into 3 components

- Deaths in congregate settings were removed from the total death counts to better represent community area residents affected by community-level transmission.
- All three components were averaged into the cumulative COVID burden score

# Construction of index



- Each component is measured and ranked by community area
- Rank scores (0-76) are combined and averaged into two groups: Risk Factors and COVID Burden
- The average of the ranks in each group are calculated for each community area
- Higher rank score indicates more vulnerability
- Index is inherently weighted towards COVID burden
  - COVID burden: 3 components averaged
  - Risk factor burden: 7 components averaged
- The COVID-19 Community Vulnerability Index score for each community area is calculated as follows:

**(Average of *Risk Factor* ranks + Average of Overall *COVID Burden* ranks )**

**2**

# Findings



- **Rank-values** of Chicago community areas ranged from 4 (lowest vulnerability) to 64 (highest vulnerability). Tie scores between CAs were ranked equally with each other.
- A **high** CCVI score correlates **most** strongly with **high mobility during COVID, low socioeconomic status, high rates of COVID hospital admission** and **high rates of COVID mortality**
- Strength of index appears well balanced between traditional measures of vulnerability (SES) and COVID-specific measures (mobility, morbidity/mortality)
- 26 **HIGH** Vulnerability Community Areas and 15 in the top quintile
  - 7 majority **Latinx**; 8 majority **Black**;
  - 9 communities on the Northwest and Southwest sides and 6 on Southside and far Southside;
  - Top 15 includes all PC+ zipcodes and 2 of 3 RERRT community areas
- Residents of high vulnerability community areas have been almost **3 times as likely to have died from COVID-19** as low vulnerability community areas. Top 10 CAs account for 25% of all COVID-19 deaths



# Top 15 Chicago COVID-19 Community Vulnerability Index

(RANK 0 thru 76)	Top Quintile (more vulnerable)
	Majority African American
	Majority Latinx

Zipcode bold: PC+/ RERRT	Chicago Community Area Name	Chicago Community COVID-19 Vulnerability Index Score (CCVI)	CCVI Category	Average of risk factor rank scores	Average of COVID health burden rank scores	Socioeconomic Status (national percentile)	Household Composition and Disability (national percentile)	Ratio of mobility in 2020 compared to 2019	% adults w/o primary care provider	% Frontline essential workers 1B+1C))	% Age 65+	% 18-64 yo adults w/1+ comorbid conditions	Cumulative COVID-19 incidence rate per 100k (2020)	Cumulative COVID-19 hospitalization rate per 100k (2020)	Cumulative COVID-19 mortality rate per 100k (2020)
60636	West Englewood	64	HIGH	60	67	0.94	0.85	0.99	30.2	12.1	20.2	76.4	7,675	1,598	243
60609	New City	60	HIGH	58	62	0.92	0.64	0.98	42.7	17.5	12.1	56.7	9,902	1,137	152
60632	Gage Park	59	HIGH	49	69	0.92	0.48	0.94	32.8	19.5	9.2	44.7	13,371	1,065	216
60623	North Lawndale	58	HIGH	53	64	0.93	0.81	0.99	33.5	13.1	10.8	60.0	6,831	1,310	209
60623	South Lawndale	58	HIGH	47	69	0.94	0.56	0.92	35.9	15.9	9.3	48.4	11,120	1,136	226
60629	Chicago Lawn	58	HIGH	50	66	0.94	0.58	0.90	29.8	16.8	12.3	59.5	10,934	1,180	156
60621	Englewood	55	HIGH	54	57	0.97	0.89	1.00	29.6	10.9	14.4	60.7	5,833	1,278	161
60628	Roseland	55	HIGH	54	55	0.81	0.82	0.96	29.3	13.7	18.1	68.7	5,717	1,213	176
60632	Archer Heights	53	HIGH	47	60	0.83	0.40	0.90	23.1	18.2	12.7	69.2	12,312	1,035	146
60620	Washington Heights	53	HIGH	52	54	0.75	0.83	0.93	31.3	15.4	18.2	54.7	5,781	1,257	157
60644	Austin	53	HIGH	53	53	0.88	0.80	0.94	31.1	15.2	14.3	62.4	7,792	1,022	152
60639	Montclare	53	HIGH	47	59	0.65	0.50	0.82	34.6	15.8	17.0	60.8	10,339	1,030	161
60639	Belmont Cragin	52	HIGH	43	60	0.81	0.51	0.84	33.2	20.2	9.6	40.2	13,070	1,011	160
60617	South Deering	52	HIGH	55	50	0.92	0.89	0.93	30.8	13.0	15.7	64.3	6,785	1,112	136
60651	Humboldt Park	52	HIGH	50	54	0.88	0.63	0.91	33.4	18.8	9.6	56.1	9,631	1,040	137

2 community areas (Burnside, Fuller Park) do not appear on this ranking due to very small populations (<2500 persons (as of 2019))





# Findings

## High Vulnerability

high to low score

West Englewood  
New City  
Gage Park  
North Lawndale  
South Lawndale  
Chicago Lawn  
Burnside\*  
Englewood  
Roseland  
Archer Heights  
Washington Heights  
Austin  
Montclare  
South Deering  
Belmont Cragin  
Humboldt Park  
Fuller Park\*  
Hermosa  
West Pullman  
Garfield Ridge  
Lower West Side  
West Elsdon  
West Lawn  
Brighton Park  
Auburn Gresham  
East Garfield Park

\* population <2500

## Medium Vulnerability

high to low score

West Garfield Park  
Pullman  
Calumet Heights  
Greater Grand Crossing  
South Shore  
Ashburn  
Avalon Park  
East Side  
South Chicago  
Morgan Park  
Chatham  
Clearing  
Grand Boulevard  
Washington Park  
North Park  
Albany Park  
Woodlawn  
McKinley Park  
West Ridge  
Dunning  
Douglas  
Hegewisch  
Riverdale  
Portage Park  
Oakland  
Norwood Park

## Low Vulnerability

high to low score

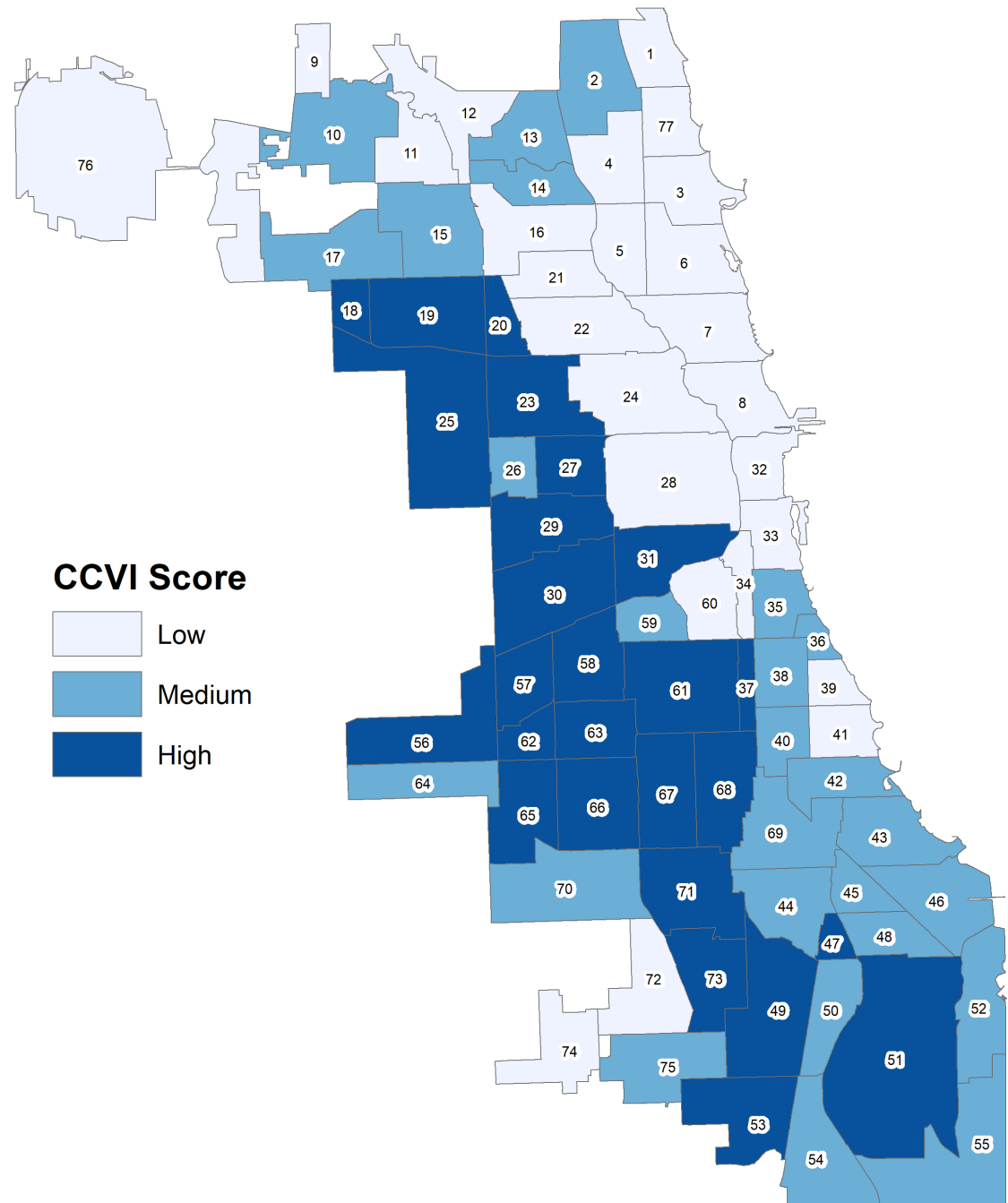
Rogers Park  
Armour Square  
Mount Greenwood  
Irving Park  
Avondale  
Logan Square  
Beverly  
Jefferson Park  
Kenwood  
Uptown  
Edison Park  
Bridgeport  
Near West Side  
O'Hare  
Forest Glen  
West Town  
Edgewater  
Hyde Park  
Near South Side  
Lincoln Square  
Near North Side  
Loop  
Lincoln Park  
Lake View  
North Center



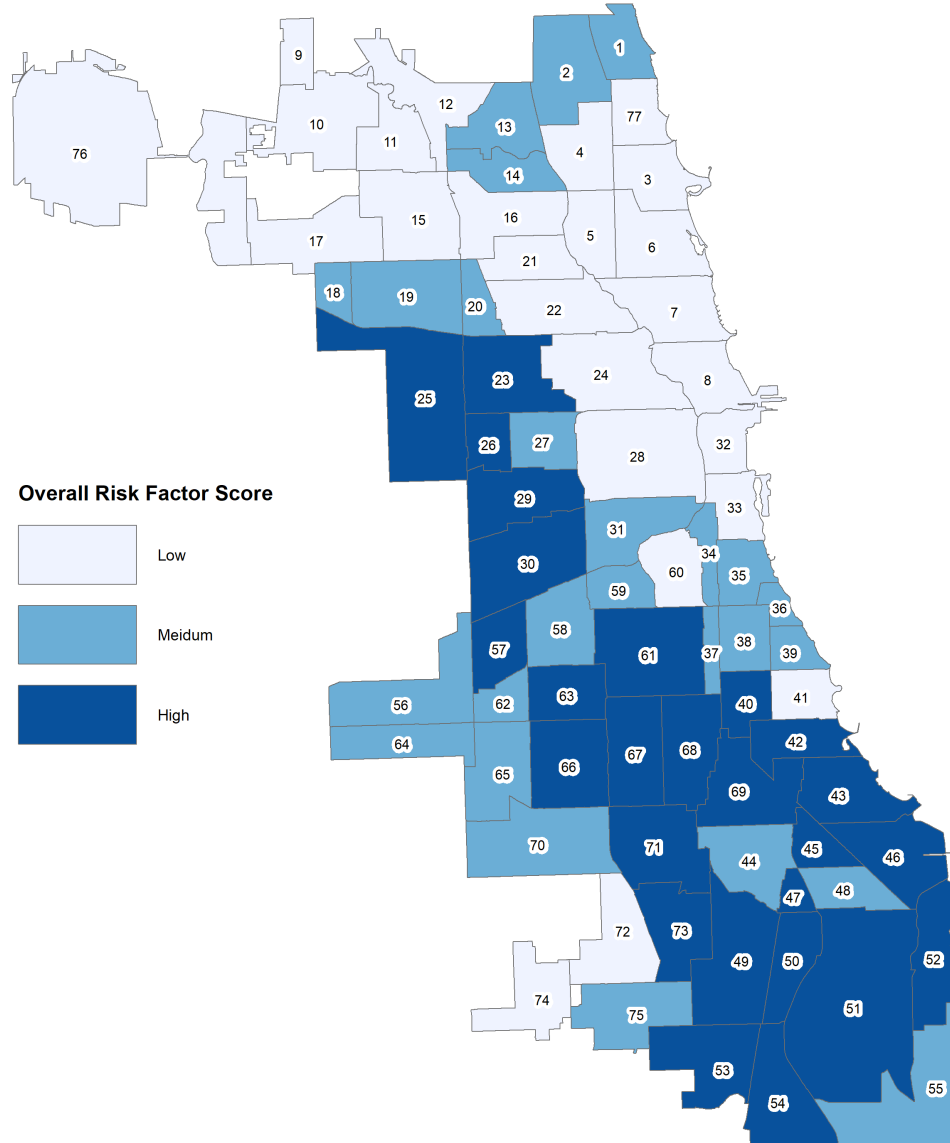
# Chicago CCVI Map



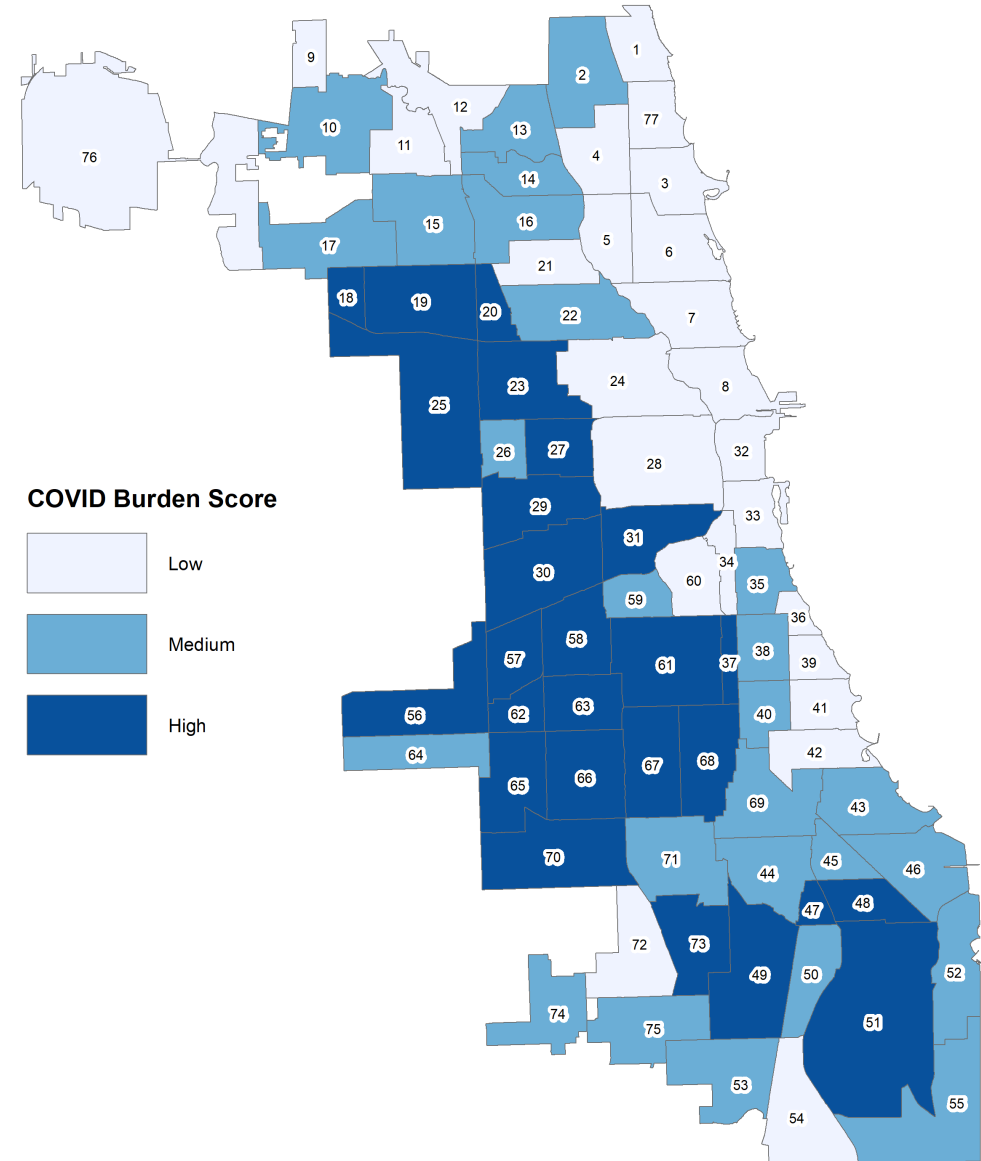
- |                       |                           |
|-----------------------|---------------------------|
| 1 Rogers Park         | 41 Hyde Park              |
| 2 West Ridge          | 42 Woodlawn               |
| 3 Uptown              | 43 South Shore            |
| 4 Lincoln Square      | 44 Chatham                |
| 5 North Center        | 45 Avalon Park            |
| 6 Lakeview            | 46 South Chicago          |
| 7 Lincoln Park        | 47 Burnside               |
| 8 Near North Side     | 48 Calumet Heights        |
| 9 Edison Park         | 49 Roseland               |
| 10 Norwood Park       | 50 Pullman                |
| 11 Jefferson Park     | 51 South Deering          |
| 12 Forest Glen        | 52 East Side              |
| 13 North Park         | 53 West Pullman           |
| 14 Albany Park        | 54 Riverdale              |
| 15 Portage Park       | 55 Hegewisch              |
| 16 Irving Park        | 56 Garfield Ridge         |
| 17 Dunning            | 57 Archer Heights         |
| 18 Montclare          | 58 Brighton Park          |
| 19 Belmont Cragin     | 59 McKinley Park          |
| 20 Hermosa            | 60 Bridgeport             |
| 21 Avondale           | 61 New City               |
| 22 Logan Square       | 62 West Elsdon            |
| 23 Humboldt Park      | 63 Gage Park              |
| 24 West Town          | 64 Clearing               |
| 25 Austin             | 65 West Lawn              |
| 26 West Garfield Park | 66 Chicago Lawn           |
| 27 East Garfield Park | 67 West Englewood         |
| 28 Near West Side     | 68 Englewood              |
| 29 North Lawndale     | 69 Greater Grand Crossing |
| 30 South Lawndale     | 70 Ashburn                |
| 31 Lower West Side    | 71 Auburn Gresham         |
| 32 Loop               | 72 Beverly                |
| 33 Near South Side    | 73 Washington Heights     |
| 34 Armour Square      | 74 Mount Greenwood        |
| 35 Douglas            | 75 Morgan Park            |
| 36 Oakland            | 76 O'Hare                 |
| 37 Fuller Park        | 77 Edgewater              |
| 38 Grand Boulevard    |                           |
| 39 Kenwood            |                           |
| 40 Washington Park    |                           |



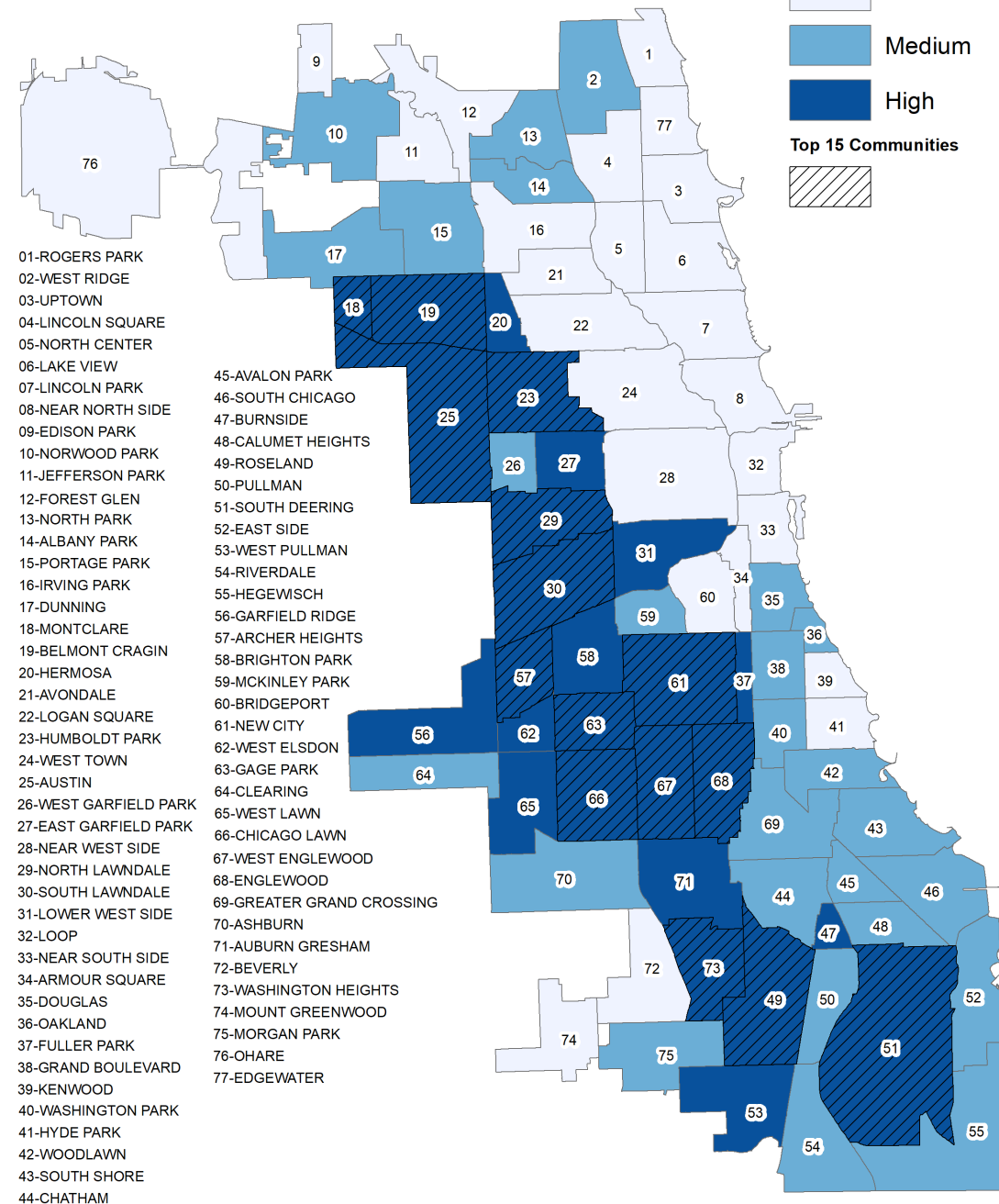
# CCVI Risk factor map

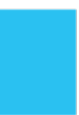


# COVID Burden map



# CCVI Score w Top 15 Community Area overlay





# Limitations

- Occupation groups at the community area/census tract level include a broader set of job types than are proscribed by ACIP guidance
- Occupations did not include retail workers or cashiers which could exclude important subgroups with high exposure to the public
- Surgo components were originally validated at the county level from a nationally developed index; Chicago index not formally validated
- There exist factors related to social vulnerability, COVID risk and vaccine hesitancy that are not included in this index
- Index only includes COVID outcome data through 12/31/20 – outbreak situation could change significantly altering distribution of disease impact